
SCIENCE ASSESSMENT PROGRAM 1986

PRELIMINARY REPORT ON THE WRITTEN COMPONENT

Manitoba
Education
Curriculum
Development and
Implementation



MANITOBA SCIENCE ASSESSMENT PROGRAM 1986

**PRELIMINARY REPORT:
TEST DATA**

**A REPORT OF THE
CURRICULUM DEVELOPMENT AND IMPLEMENTATION BRANCH
MANITOBA EDUCATION
PROVINCE OF MANITOBA**

371.26097127

Manitoba Science Assessment Program, 1986
Preliminary report on the written component.

ISBN 0-7711-0627-0

1. Science--Manitoba--Ability testing.
2. Educational tests and measurements--
Manitoba.
 - I. Manitoba. Curriculum Development and
Implementation Branch.

PREFACE

The Provincial Assessment of Science at grade levels 3, 6, and 9 was conducted in May, 1986. There are four major components to the Assessment: Written testing, Performance testing, Teacher Survey, and 1980-85 Comparison testing (grades 5, 8, and 11). The Written Component is the "paper-and-pencil" part of the testing which involved virtually all of the schools in Manitoba with students in grades 3, 6, and 9. This Preliminary Report contains a summary of student performance for the province on the Written Component only. The Final Report will contain results from all four components; as well, it will contain conclusions and recommendations based on the data and on the interpretations by panels of educators.

The purpose of the Preliminary Report is to provide detailed information on the Written Component for use by classroom teachers in the review of the results in their classrooms. All data are based on the province as a whole for English language students of science including French Immersion students. The Preliminary Report contains results of the provincial testing for all the test areas and for the items. It is necessary to refer to the student test booklets and to the scoring manuals when using these results. Schools and divisions in Manitoba should have received copies of the testing materials. If you require a copy of the test and manual, please contact us at:

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CHAPTER 1

INTRODUCTION

A number of subtests have been delineated for the Science Assessment at all three grade levels. These are grouped under seven major categories:

- A. Content of Science,
- B. Processes of Science,
- C. Skills,
- D. Problem Solving and Decision Making,
- E. Attitude toward Science,
- F. Science and Society,
- G. Nature of Science.

The Written Component items represent both the cognitive and affective domains. The items in the cognitive domain have a correct or best answer, and marks on these items can be accumulated to determine a score for each subtest. The multiple-choice items were awarded one mark for the correct response. The majority of items which required students to write a response were awarded one mark for the correct response. A few open-ended questions, however, had more than one point allotted to them.

The items in the affective domain assessed the beliefs, attitudes, values, enjoyment, and preferences of students with respect to aspects of science. Items in this domain were not marked as correct or incorrect, and, therefore, marks could not be accumulated into subtests. (However, each item is still designated for a particular subtest.) The proportions of students selecting the response options for each item are reported. The responses give an indication of students' attitudes to the particular aspect of science identified by the item.

The provincial sample results for the Written Component are presented for the three grade levels in Chapters 2 through 4.

At each grade tested a 10% sample of students was drawn from all schools containing the relevant grades. The sample sizes were 1293, 1330, and 1181 respectively at grades 3, 6, and 9.

PERCENT OF STUDENTS CHOOSING EACH RESPONSE

The proportion of students in the provincial sample selecting each of the response options (A,B,C,D, or E) is presented as a percentage for each of the multiple-choice items. The correct option is identified by an asterisk (*) following the percent of students selecting the option.

The percent of students obtaining a mark for each cognitive written-response item is given in the "A" column, and is followed by an asterisk (*). The percent of students giving an incorrect written response is indicated in the "E" column.

For the affective multiple-choice items the percent of students selecting each option is indicated. Since there is no correct response, these items do not have an asterisk (*) following any of the percentages.

The column marked "NR" presents the percent of students who did not provide a response to a particular item.

SUBTESTS

The categories and subtests identified for the assessment are listed at the beginning of each grade's results. The test items corresponding to each subtest are specified for the particular grade level, including whether the items have a correct answer (cognitive domain) or not (affective domain).

PERFORMANCE ON COGNITIVE SUBTESTS

A summary of the Written Component results is presented for each category and each of its subtests that contain cognitive items. (See pages 8, 17 and 30.)

The information presented in the tables includes:

- the SUBTEST, which is the label for the subtest;
- the number of QUESTIONS PER SUBTEST;
- the MEAN RAW SCORE, which is the average (mean) number of questions correct (marks) for the subtest;
- the MEAN PERCENT, which is the average (mean) number of questions correct for the subtest converted to a percentage of the total number of questions per subtest; and
- the STANDARD DEV RAW SCORE, which is the standard deviation of raw scores for the subtest.

FREQUENCY BAR CHART

There is a FREQUENCY BAR CHART for each of the major categories containing cognitive items. This chart depicts the proportions of students in the provincial sample who obtained various raw scores (number of correct responses) totalled for the cognitive items pertaining to the particular category.

The table adjacent to the bar chart indicates for each raw score (number of correct responses):

- the frequency (FREQ) or number of students obtaining this raw score;
- the cumulative frequency (CUM. FREQ) is the number of students obtaining this raw score plus those with lower raw scores;
- the proportion as a percentage (PERCENT) of students obtaining this raw score; and
- the cumulative frequency as a percent (CUM PERCENT) of students obtaining this raw score plus those with lower raw scores. This can be used to "locate" the performance of a group of students relative to the provincial sample.

A CAUTIONARY NOTE REGARDING USE OF THESE RESULTS

The Science Assessment was designed to assess the goals and objectives of the Manitoba curriculum with the intent to identify strengths and weaknesses of the program. The Written tests can be used to measure group performance and analyze the effectiveness of local programs, but are not intended to measure the achievement of individual students. If students' results on these tests are to be used for reporting purposes, they should only be used in conjunction with other information gathered on the students.

CHAPTER 2

PROVINCIAL RESULTS - GRADE 3

SUBTESTS - GRADE 3

<u>CATEGORIES</u>	<u>ITEM NUMBERS</u>
A. CONTENT OF SCIENCE	
1. Facts -----	56-65
2. Terminology -----	66-73
3. Concepts/Relationships -----	74-79
4. Theories and Conceptual Schemes -----	80
5. Explanation of Physical Phenomena -----	81-85
6. Trends and Sequences -----	86-87
B. PROCESSES OF SCIENCE	
7. Observing and Classifying -----	1-9
8. Measuring/Quantifying -----	10-16
9. Identifying, Collecting, Interpreting, Reporting Data---	17-24
10. Making Inferences/Hypothesizing -----	25-29
11. Building, Testing, and Revising Theoretical Models - No Items	
C. SKILLS FOR SCIENCE	
12. Skills Using Laboratory Equipment -----	no items
13. Skills Associated With Safety -----	no items
D. PROBLEM SOLVING AND DECISION MAKING	
14. Cognition -----	30-31
15. Following Instructions/Using Algorithms--	no items
16. Using Inquiry Techniques -----	no items
17. Application of Knowledge -----	32-34
E. ATTITUDE TOWARD SCIENCE	
18. Enjoying Science -----	39-43
19. Valuing Science -----	35-38
20. Adopting Attitudes of Science -----	44-46
21. Making Career Decisions -----	47-48
F. SCIENCE AND SOCIETY	
22. Science in Canada -----	no items
23. Health, Nutrition and Agriculture -----	49-51
24. Environment -----	52-55
25. Energy -----	52-55
26. Recreation -----	no items
G. NATURE OF SCIENCE	
27. History of Science -----	no items
28. Philosophy of Science -----	no items

P R O V I N C I A L R E S U L T S

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 3

PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION

(* INDICATES CORRECT RESPONSE)						
QUESTION	A	B	C	D	E	NR
B7. OBSERVING & CLASSIFY...						
1	11.3	3.1	78.3*	6.3	0.0	1.0
2	83.5*	4.6	7.9	2.2	0.0	1.8
3	3.3	5.4	85.5*	3.4	0.0	2.3
4	28.9	51.9*	10.4	7.3	0.1	1.4
5	59.4*	23.8	7.9	7.9	0.0	1.0
6	6.0	88.6*	1.8	2.6	0.0	1.1
7	2.6	1.5	3.5	88.9*	0.1	3.5
8	11.3	1.9	79.5*	6.0	0.0	1.4
9	11.8	72.2*	2.9	12.0	0.0	1.0
B8. MEASURING/QUANTIFYING						
10	40.5	41.4*	10.7	5.3	0.1	2.0
11	4.4	3.7	5.8	85.2*	0.1	0.9
12	90.1*	3.4	2.7	2.6	0.0	1.2
13	77.1*	0.1	0.1	0.1	21.7	1.0
14	34.6	32.3*	5.1	27.1	0.0	0.9
15	6.7	12.5	76.3*	3.6	0.0	1.0
16	31.8	4.4	57.4*	4.6	0.1	1.7
B9. IDENTIFYING...						
17	10.5	3.3	3.2	81.0*	0.1	1.9
18	3.7	3.9	85.4*	6.0	0.1	1.0
19	85.8*	0.0	0.1	0.0	11.2	2.9
20	82.9*	0.0	0.0	0.1	13.7	3.3
21	89.4*	0.4	0.3	0.0	6.4	3.5
22	16.2	48.0*	20.7	11.7	0.0	3.4
23	10.1	3.3	68.1*	17.2	0.1	1.1
24	4.5	3.8	16.7	73.3*	0.0	1.7
B10. MAKING INFERENCES...						
25	4.4	92.2*	1.2	1.2	0.0	1.1
26	8.9	6.4	14.2	68.7*	0.0	1.8
27	47.5*	15.9	23.8	9.4	0.1	3.4
28	68.1*	9.2	12.5	8.2	0.0	2.0
29	0.9	1.4	13.2	82.9*	0.0	1.6
D14. COGNITION						
30	21.3	29.3	37.0*	9.8	0.2	2.3
31	57.5*	5.7	7.1	27.1	0.5	2.2
D17. APPLICATION OF KNOW...						
32	69.7*	0.1	0.0	0.1	24.7	5.4
33	29.2*	0.2	0.2	0.2	63.2	7.1
34	12.1*	0.6	0.2	1.5	41.5	44.1
E19. VALUING SCIENCE						
35	29.2	24.6	10.6	34.1	0.2	1.3
36	17.1	22.5	25.3	33.3	0.2	1.7
37	34.6	28.1	10.7	25.1	0.0	1.5
38	49.3	20.0	13.0	16.0	0.1	1.6
E18. ENJOYING SCIENCE						
39	74.1	11.7	4.7	8.8	0.0	0.7
40	72.9	16.0	3.5	6.8	0.0	0.8
41	70.5	14.6	5.3	9.1	0.0	0.5

42	54.7	17.0	13.9	13.6	0.1	0.7
43	44.5	23.0	17.9	14.2	0.0	0.5
E20. ADOPTING ATTITUDES...						
44	64.6	23.4	6.0	5.6	0.0	0.5
45	59.6	25.9	8.0	5.6	0.0	0.8
46	39.7	35.8	19.2	4.3	0.0	1.0
E21. MAKING CAREER DECISIONS						
47	46.5	26.7	16.0	10.2	0.0	0.6
48	34.0	32.3	26.1	6.5	0.0	1.1
F23. HEALTH, NUTRITION...						
49	50.1	31.2	14.1	3.7	0.0	0.9
50	39.4	42.6	13.2	3.6	0.1	1.1
51	53.6	24.7	18.3	2.6	0.0	0.9
F24,25 ENVIRONMENT & ENERGY						
52	42.7	35.1	13.3	8.2	0.0	0.7
53	54.2	26.8	6.7	11.2	0.1	1.0
54	47.7	36.8	6.8	8.0	0.0	0.7
55	62.5	20.2	10.6	6.1	0.0	0.6
A1. FACTS						
56	65.5*	0.0	0.1	0.1	28.6	5.7
57	44.2*	0.1	0.0	0.1	37.4	18.3
58	84.8*	0.0	0.0	0.0	11.8	3.4
59	81.4*	0.0	0.0	0.0	13.2	5.4
60	66.2*	0.0	0.0	0.0	25.3	8.5
61	72.9*	0.0	0.0	0.0	22.3	4.9
62	72.5*	1.5	4.9	6.1	0.3	14.7
63	6.0	2.2	74.4*	1.8	0.4	15.3
64	2.9	79.0*	3.1	0.9	0.4	13.8
65	6.0	1.9	2.2	75.0*	0.5	14.5
A2. TERMINOLOGY						
66	3.3	90.0*	2.7	2.2	0.0	1.8
67	17.5	17.0	14.6	48.0*	0.1	2.9
68	14.3	76.0*	6.3	0.0	0.1	3.2
69	19.3	5.6	72.1*	0.1	0.0	2.9
70	63.8*	14.5	18.3	0.2	0.1	3.2
71	15.5	31.5	46.9*	0.2	0.3	5.5
72	48.0*	14.8	31.2	0.2	0.3	5.5
73	31.1	47.4*	15.7	0.2	0.2	5.5
A3. CONCEPTS/RELATIONSHIPS						
74	7.8	62.8*	19.6	7.0	0.2	2.6
75	48.5*	0.0	0.0	0.0	47.3	4.3
76	80.8*	0.0	0.0	0.2	16.6	2.4
77	24.9	7.0	10.1	55.8*	0.2	1.9
78	81.7*	11.4	3.2	1.6	0.1	1.9
79	1.2	82.5*	9.5	3.9	0.2	2.6
A4. THEORIES & CONCEPT...						
80	62.7*	0.0	0.0	0.0	29.9	7.4
A5. EXPLAN. OF PHYSICAL...						
81	44.9*	0.1	0.1	0.0	49.3	5.6
82	73.1*	0.1	0.1	0.0	18.1	8.7
83	12.9*	0.0	0.0	0.0	70.6	16.5
84	6.9*	0.0	0.0	0.0	76.3	16.8
85	52.4*	0.0	0.0	0.0	41.4	6.3
A6. TRENDS AND SEQUENCES						
86	56.0*	0.0	0.0	0.0	32.6	11.4
87	37.7*	0.0	0.0	0.0	43.2	19.1

P R O V I N C I A L R E S U L T S

SCIENCE ASSESSMENT 1986 - GRADE 3

NUMBER OF STUDENT SCORES USED TO COMPUTE STATISTICS = 1293

PERFORMANCE ON COGNITIVE SUBTESTS

SUBTEST	QUESTIONS PER SUBTEST	MEAN RAW SCORE	MEAN PERCENT	STANDARD DEV RAW SCORE
TOTAL TEST (COGNITIVE)	66	42.93	65.04	10.03
A1. FACTS	10	7.16	71.59	2.55
A2. TERMINOLOGY	8	4.92	61.53	2.00
A3. CONCEPTS...	6	4.12	68.69	1.39
A4. THEORIES...	1	0.63	62.72	0.48
A5. EXPLANATION...	5	1.90	38.02	1.15
A6. TRENDS...	2	0.94	46.83	0.79
A. CONTENT (TOTAL)	32	19.67	61.46	5.74
B7. OBSERVING...	9	6.88	76.42	1.65
B8. MEASURING...	7	4.60	65.67	1.44
B9. IDENTIFYING...	8	6.14	76.74	1.73
B10. MAKING INFERENCES.	5	3.59	71.86	1.15
B. PROCESSES (TOTAL)	29	21.21	73.13	4.53
D14. COGNITION	2	0.95	47.25	0.70
D17. APPLICATION...	3	1.11	36.99	0.88
D. PROBLEM SOLVE (TOTAL)	5	2.05	41.10	1.24

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - A . C O N T E N T O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 3

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	*	3	3	0.23	0.23
1		1	4	0.08	0.31
2	*	6	10	0.46	0.77
3	*	3	13	0.23	1.01
4	**	8	21	0.62	1.62
5	*	5	26	0.39	2.01
6	**	12	38	0.93	2.94
7	**	8	46	0.62	3.56
8	**	11	57	0.85	4.41
9	***	13	70	1.01	5.41
10	*****	24	94	1.86	7.27
11	*****	30	124	2.32	9.59
12	*****	24	148	1.86	11.45
13	*****	35	183	2.71	14.15
14	*****	42	225	3.25	17.40
15	*****	55	280	4.25	21.66
16	*****	57	337	4.41	26.06
17	*****	72	409	5.57	31.63
18	*****	77	486	5.96	37.59
19	*****	72	558	5.57	43.16
20	*****	96	654	7.42	50.58
21	*****	101	755	7.81	58.39
22	*****	98	853	7.58	65.97
23	*****	90	943	6.96	72.93
24	*****	70	1013	5.41	78.34
25	*****	93	1106	7.19	85.54
26	*****	58	1164	4.49	90.02
27	*****	55	1219	4.25	94.28
28	*****	38	1257	2.94	97.22
29	***	17	1274	1.31	98.53
30	**	10	1284	0.77	99.30
31	**	8	1292	0.62	99.92
32		1	1293	0.08	100.00

20 40 60 80 100

FREQUENCY

P R O V I N C I A L R E S U L T S

D I S T R I B U T I O N O F S C O R E S - B . P R O C E S S E S O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 3

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
2		1	1	0.08	0.08
3		2	3	0.15	0.23
4	*	5	8	0.39	0.62
5		1	9	0.08	0.70
6	*	4	13	0.31	1.01
7	*	4	17	0.31	1.31
8	*	3	20	0.23	1.55
9	**	8	28	0.62	2.17
10	**	10	38	0.77	2.94
11	**	12	50	0.93	3.87
12	***	17	67	1.31	5.18
13	*****	24	91	1.86	7.04
14	*****	22	113	1.70	8.74
15	*****	29	142	2.24	10.98
16	*****	36	178	2.78	13.77
17	*****	45	223	3.48	17.25
18	*****	67	290	5.18	22.43
19	*****	80	370	6.19	28.62
20	*****	104	474	8.04	36.66
21	*****	95	569	7.35	44.01
22	*****	145	714	11.21	55.22
23	*****	143	857	11.06	66.28
24	*****	126	983	9.74	76.02
25	*****	119	1102	9.20	85.23
26	*****	79	1181	6.11	91.34
27	*****	68	1249	5.26	96.60
28	*****	37	1286	2.86	99.46
29	*	7	1293	0.54	100.00

20 40 60 80 100 120 140

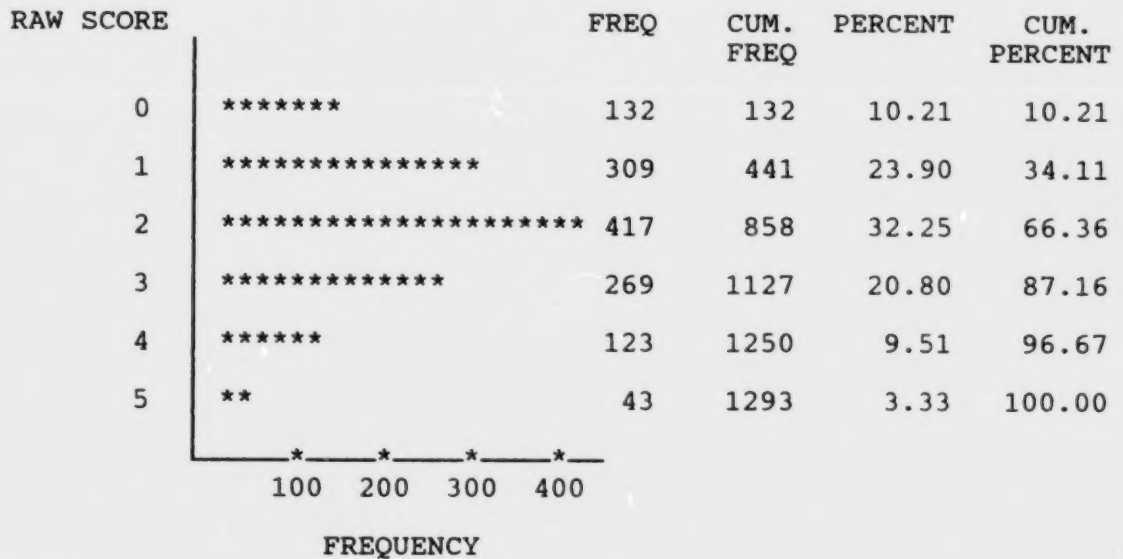
F R E Q U E N C Y

P R O V I N C I A L R E S U L T S

DISTRIBUTION OF SCORES - D. PROBLEM SOLVING & DECISION MAKING

SCIENCE ASSESSMENT 1986 - GRADE 3

FREQUENCY BAR CHART



CHAPTER 3

PROVINCIAL RESULTS - GRADE 6

SUBTESTS - GRADE 6

<u>CATEGORIES</u>	<u>ITEM NUMBERS</u>
A. CONTENT OF SCIENCE	
1. Facts -----	24-36
2. Terminology -----	37-45
3. Concepts/Relationships -----	46-55
4. Theories and Conceptual Schemes -----	56-60
5. Explanation of Physical Phenomena -----	61-63
6. Trends and Sequences -----	64-66
B. PROCESSES OF SCIENCE	
7. Observing and Classifying -----	67-71
8. Measuring/Quantifying -----	72-75
9. Identifying, Collecting, Interpreting, Reporting Data---	76-86
10. Making Inferences/Hypothesizing -----	87-96
11. Building, Testing, and Revising Theoretical Models ---	97-100
C. SKILLS FOR SCIENCE	
12. Skills Using Laboratory Equipment -----	no items
13. Skills Associated With Safety -----	no items
D. PROBLEM SOLVING AND DECISION MAKING	
14. Cognition -----	101-103
15. Following Instructions/Using Algorithms--	no items
16. Using Inquiry Techniques -----	104-110
17. Application of Knowledge -----	111-113
E. ATTITUDE TOWARD SCIENCE	
18. Enjoying Science -----	1-5
19. Valuing Science -----	6-13
20. Adopting Attitudes of Science -----	14-16
21. Making Career Decisions -----	17-23
F. SCIENCE AND SOCIETY	
22. Science in Canada -----	no items
23. Health, Nutrition and Agriculture -----	114-117
24. Environment -----	118-121
25. Energy -----	122-123
26. Recreation -----	no items
G. NATURE OF SCIENCE	
27. History of Science -----	124-131
28. Philosophy of Science -----	no items

P R O V I N C I A L R E S U L T S

SCIENCE ASSESSMENT 1986 - GRADE 6

PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION

(* INDICATES CORRECT RESPONSE)

QUESTION	A	B	C	D	E	NR
E18. ENJOYING SCIENCE						
1	61.3	18.8	6.8	11.1	0.0	2.0
2	73.8	16.5	3.8	3.8	0.0	2.0
3	65.8	17.1	5.3	9.8	0.0	2.0
4	37.2	19.6	24.4	16.9	0.0	1.9
5	29.7	22.4	28.3	17.6	0.1	2.0
E19. VALUING SCIENCE						
6	23.7	41.4	29.9	2.9	0.0	2.0
7	33.8	34.7	27.1	2.4	0.0	2.0
8	57.7	23.2	14.7	2.4	0.0	2.0
9	68.0	22.5	4.4	2.9	0.0	2.1
10	22.0	35.9	18.4	21.4	0.2	2.1
11	12.1	31.5	30.1	23.8	0.1	2.5
12	41.9	34.7	9.0	12.1	0.0	2.3
13	64.9	20.3	4.2	8.4	0.0	2.2
E20. ADOPTING ATTITUDES...						
14	10.8	5.7	70.8	10.7	0.0	2.0
15	29.5	49.7	2.3	8.3	8.0	2.1
16	78.0	14.7	5.0	0.1	0.0	2.3
E21. MAKING CAREER DEC... - ATTITUDE						
17	44.1	39.4	14.1	0.0	0.0	2.4
18	52.3	33.4	12.3	0.0	0.0	2.0
E21. MAKING CAREER DEC... - COGNITIVE						
19	1.1	94.1*	0.3	0.7	2.1	1.8
20	1.6	0.4	84.5*	7.3	4.1	2.1
21	4.3	1.7	4.6	15.8	71.4*	2.3
22	1.1	0.9	6.8	72.2*	16.7	2.3
23	90.5*	0.8	1.9	1.4	3.2	2.2
A1. FACTS						
24	20.4	23.2	53.2*	0.2	0.1	2.9
25	7.3	17.5	5.9	66.8*	0.1	2.5
26	35.6*	2.8	1.4	57.4	0.2	2.7
27	70.8*	0.0	0.0	0.2	21.6	7.4
28	39.5*	0.1	0.0	0.1	46.0	14.3
29	37.8*	0.1	0.0	0.3	52.3	9.5
30	8.4	10.3	13.1	58.3*	1.2	8.7
31	42.8*	0.2	0.1	0.2	41.7	15.2
32	84.2*	0.0	0.0	0.0	12.2	3.6
33	85.9*	0.0	0.0	0.0	9.2	5.0
34	84.8*	0.2	0.1	0.0	8.9	6.1
35	16.3	69.5*	10.8	0.0	0.0	3.4
36	72.3*	11.3	12.8	0.0	0.2	3.5

A2. TERMINOLOGY

37	30.1*	1.6	2.5	0.1	57.7	8.0
38	25.8	39.3*	25.9	0.2	0.1	8.8
39	54.1*	26.0	11.0	0.2	0.0	8.6
40	12.2	34.0	44.5*	0.3	0.2	8.8
41	18.9	63.2*	9.0	0.2	0.2	8.5
42	14.0	15.6	38.7*	27.3	0.1	4.3
43	60.3*	11.1	11.4	14.1	0.1	3.0
44	71.2*	0.1	0.2	0.1	17.4	11.1
45	41.7*	0.0	0.1	0.0	35.8	22.4

A3. CONCEPTS/RELATIONSHIPS

46	62.0*	0.2	0.1	0.0	28.2	9.6
47	47.0*	0.1	0.1	0.2	39.5	13.1
48	13.9	13.9	7.6	59.6*	0.1	4.9
49	70.7*	3.8	9.8	11.0	0.1	4.7
50	10.8	2.3	2.9	79.6*	0.2	4.2
51	9.2	7.7	75.9*	3.1	0.1	4.0
52	3.2	83.6*	7.3	1.7	0.2	4.1
53	58.0*	5.9	14.1	18.6	0.0	3.4
54	78.4*	2.1	1.6	1.3	11.3	5.3
55	7.4	65.4*	11.9	8.5	0.1	6.8

A4. THEORIES & CONCEPT...

56	62.3*	0.0	0.2	0.0	26.7	10.9
57	52.6*	0.1	0.1	0.0	29.1	18.2
58	10.3*	0.0	0.0	0.0	73.0	16.7
59	29.7*	0.0	0.0	0.0	54.4	15.9
60	18.1*	0.0	0.0	0.0	55.3	26.6

A5. EXPLAN. OF PHYSICAL...

61	39.5*	0.1	0.2	0.1	51.6	8.6
62	8.4	4.1	65.2*	17.5	0.1	4.7
63	10.5	52.0*	23.9	8.0	0.3	5.3

A6. TRENDS AND SEQUENCES

64	59.4*	0.1	0.2	0.5	29.1	10.8
65	51.8*	0.2	0.2	0.2	27.4	20.4
66	32.2*	0.4	0.4	0.0	36.9	30.2

B7. OBSERVING & CLASSIFY...

67	77.5*	9.6	3.1	4.9	0.0	4.9
68	9.3	2.9	79.8*	3.7	0.0	4.2
69	16.8	44.0*	25.6	9.5	0.0	4.1
70	1.6	3.2	5.6	85.0*	0.1	4.5
71	6.1	11.0	7.6	65.8*	0.2	9.3

B8. MEASURING/QUANTIFYING

72	11.7	59.2*	6.8	16.5	0.2	5.5
73	55.9*	0.2	0.2	0.1	39.1	4.5
74	27.4	57.8*	7.7	1.7	0.1	5.4
75	14.3	0.9	74.1*	3.2	0.3	7.3

B9. IDENTIFYING...

76	64.1*	0.1	0.4	0.2	29.1	6.2
77	23.4	4.4	7.7	57.7*	0.2	6.7
78	14.3	65.6*	8.9	2.0	0.5	8.6
79	36.9*	0.2	0.0	0.2	32.7	30.1
80	49.8*	0.2	0.2	0.1	28.0	21.7
81	47.8*	0.0	0.4	0.0	29.8	22.0
82	52.0*	0.2	0.2	0.0	26.8	20.8
83	4.0	4.3	66.3*	16.4	0.1	8.9
84	63.3*	0.1	0.2	0.1	9.7	26.7
85	61.4*	0.0	0.2	0.0	12.6	25.8
86	61.4*	0.2	0.0	0.0	12.3	26.2

B10. MAKING INFERENCES...

87	66.8*	7.5	14.4	7.9	0.1	3.2
88	6.8	4.7	6.9	78.2*	0.1	3.4
89	60.7*	6.6	10.3	18.7	0.1	3.6
90	6.2	11.1	75.3*	3.8	0.0	3.7
91	9.3	69.8*	12.3	4.9	0.0	3.7
92	41.8*	0.3	0.3	0.1	37.0	20.5
93	60.5*	0.4	0.2	0.0	29.6	9.4
94	4.4	12.5	71.6*	8.0	0.1	3.4
95	1.4	3.7	86.1*	4.6	0.0	4.2
96	2.3	12.7	7.3	73.5*	0.0	4.1

B11. BUILDING, TESTING...

97	15.1	48.3*	11.2	4.3	15.6	5.5
98	24.5	8.4	16.9*	3.2	41.7	5.3
99	35.7*	1.4	38.3	1.7	17.9	4.9
100	3.5	3.2	7.9	78.8*	2.1	4.5

D14. COGNITION

101	25.3*	40.2	8.6	21.4	0.1	4.4
102	6.5	14.2	71.4*	4.0	0.1	3.9
103	76.2*	3.0	4.0	12.6	0.1	4.1

D16. USING INQUIRY TECHNIQUES

104	58.1*	0.1	0.0	0.2	33.2	8.4
105	52.9*	0.2	0.1	0.2	32.9	13.8
106	53.6*	0.0	0.1	0.1	37.7	8.6
107	1.8	12.3	4.4	76.9*	0.1	4.6
108	73.5*	0.1	0.1	0.2	12.1	14.0
109	35.9*	0.2	0.0	0.0	9.1	54.8
110	12.4*	0.0	0.0	0.0	13.8	73.8

D17. APPLICATION OF KNOW...

111	49.5*	0.1	0.0	0.0	44.2	6.2
112	26.2*	0.0	0.1	0.0	67.9	5.9
113	14.4*	0.1	0.0	0.0	63.9	21.7

F23. HEALTH, NUTRITION...

114	61.6*	0.1	0.0	0.0	27.0	11.4
115	46.2*	0.0	0.1	0.0	32.4	21.3
116	73.8*	0.0	0.0	0.0	13.5	12.7
117	44.7*	0.0	0.0	0.0	28.9	26.4

F24. ENVIRONMENT

118	61.2*	0.0	0.0	0.1	27.9	10.8
119	50.6*	0.2	0.0	0.0	36.0	13.2
120	31.3*	0.1	0.1	0.0	50.2	18.4
121	22.9*	0.2	0.0	0.1	48.0	28.7

F25. ENERGY

122	39.8*	0.3	0.1	0.0	35.6	24.2
123	29.3*	0.3	0.2	0.2	44.5	25.5

G27. HISTORY OF SCIENCE

124	8.0	76.5*	1.7	6.2	1.2	6.4
125	3.7	2.6	82.9*	2.6	2.6	5.6
126	15.7	7.6	4.1	63.2*	2.9	6.5
127	24.7	2.3	2.7	7.1	56.5*	6.7
128	14.7	32.6*	7.9	11.1	22.9	10.8
129	6.9	12.3	58.2*	6.0	6.5	10.1
130	41.9*	10.8	5.8	18.8	12.7	10.1
131	14.8	12.3	6.2	37.7*	18.2	10.7

P R O V I N C I A L R E S U L T S

SCIENCE ASSESSMENT 1986 - GRADE 6 RESULTS

NUMBER OF STUDENT SCORES USED TO COMPUTE STATISTICS 1330

PERFORMANCE ON COGNITIVE SUBTESTS

SUBTEST	QUESTIONS PER SUBTEST	MEAN RAW SCORE	MEAN PERCENT	STANDARD DEV RAW SCORE
TOTAL TEST (COGNITIVE)	113	64.38	56.97	17.62
A1. FACTS	13	8.02	61.67	2.38
A2. TERMINOLOGY	9	4.43	49.24	2.11
A3. CONCEPTS...	10	6.80	68.02	2.25
A4. THEORIES...	5	1.73	34.59	1.22
A5. EXPLANATION...	3	1.57	52.23	0.94
A6. TRENDS...	3	1.43	47.79	1.04
A. CONTENT (TOTAL)	43	23.98	55.77	6.90
B7. OBSERVING...	5	3.52	70.44	1.30
B8. MEASURING...	4	2.47	61.73	1.17
B9. IDENTIFYING...	11	6.27	56.96	3.15
B10. MAKING INFERENCES.	10	6.84	68.44	2.29
B11. BUILDING, TEST...	4	1.80	44.94	1.04
B. PROCESSES (TOTAL)	34	20.90	61.46	6.55
D14. COGNITION	3	1.73	57.59	0.87
D16. USING INQUIRY...	7	3.63	51.92	1.83
D17. APPLICATION...	3	0.90	30.03	0.83
D. PROBLEM SOLVE (TOTAL)	13	6.26	48.18	2.70
E21. MAKING CAREER...	5	4.13	82.51	1.30
E. ATTITUDE (TOTAL)	5	4.13	82.51	1.30
F23. HEALTH, NUTRITION..	4	2.26	56.58	1.21
F24. ENVIRONMENT	4	1.66	41.50	1.18
F25. ENERGY	2	0.69	34.59	0.75
F. SCIENCE-SOCIETY (TOT)	10	4.62	46.15	2.47
G27. HISTORY OF SCIENCE	8	4.50	56.20	2.11
G. NATURE (TOTAL)	8	4.50	56.20	2.11

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - A . C O N T E N T O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 6

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0		1	1	0.08	0.08
4		2	3	0.15	0.23
5		1	4	0.08	0.30
6		2	6	0.15	0.45
7	*	7	13	0.53	0.98
8	*	7	20	0.53	1.50
9	**	10	30	0.75	2.26
10	***	16	46	1.20	3.46
11	***	15	61	1.13	4.59
12	*****	29	90	2.18	6.77
13	*****	22	112	1.65	8.42
14	*****	26	138	1.95	10.38
15	*****	33	171	2.48	12.86
16	*****	35	206	2.63	15.49
17	*****	41	247	3.08	18.57
18	*****	40	287	3.01	21.58
19	*****	44	331	3.31	24.89
20	*****	58	389	4.36	29.25
21	*****	68	457	5.11	34.36
22	*****	70	527	5.26	39.62
23	*****	71	598	5.34	44.96
24	*****	72	670	5.41	50.38
25	*****	78	748	5.86	56.24
26	*****	70	818	5.26	61.50
27	*****	63	881	4.74	66.24
28	*****	71	952	5.34	71.58
29	*****	62	1014	4.66	76.24
30	*****	62	1076	4.66	80.90
31	*****	62	1138	4.66	85.56
32	*****	53	1191	3.98	89.55
33	*****	42	1233	3.16	92.71
34	*****	29	1262	2.18	94.89
35	*****	32	1294	2.41	97.29
36	****	18	1312	1.35	98.65
37	**	9	1321	0.68	99.32
38	*	6	1327	0.45	99.77
39	*	3	1330	0.23	100.00

20 40 60 80

FREQUENCY

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - B . P R O C E S S E S O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 6

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0		1	1	0.08	0.08
1	*	3	4	0.23	0.30
2		2	6	0.15	0.45
3	*	7	13	0.53	0.98
4	*	3	16	0.23	1.20
5	*	5	21	0.38	1.58
6	**	12	33	0.90	2.48
7	*	7	40	0.53	3.01
8	***	16	56	1.20	4.21
9	****	22	78	1.65	5.86
10	*****	26	104	1.95	7.82
11	*****	29	133	2.18	10.00
12	*****	25	158	1.88	11.88
13	*****	43	201	3.23	15.11
14	*****	43	244	3.23	18.35
15	*****	46	290	3.46	21.80
16	*****	43	333	3.23	25.04
17	*****	56	389	4.21	29.25
18	*****	60	449	4.51	33.76
19	*****	70	519	5.26	39.02
20	*****	57	576	4.29	43.31
21	*****	61	637	4.59	47.89
22	*****	67	704	5.04	52.93
23	*****	70	774	5.26	58.20
24	*****	79	853	5.94	64.14
25	*****	95	948	7.14	71.28
26	*****	82	1030	6.17	77.44
27	*****	90	1120	6.77	84.21
28	*****	64	1184	4.81	89.02
29	*****	63	1247	4.74	93.76
30	*****	44	1291	3.31	97.07
31	*****	27	1318	2.03	99.10
32	**	8	1326	0.60	99.70
33	*	4	1330	0.30	100.00

F R E Q U E N C Y

P R O V I N C I A L R E S U L T S

DISTRIBUTION OF SCORES - D. PROBLEM SOLVING & DECISION MAKING

SCIENCE ASSESSMENT 1986 - GRADE 6

FREQUENCY BAR CHART

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	****	32	32	2.41	2.41
1	*****	35	67	2.63	5.04
2	*****	69	136	5.19	10.23
3	*****	90	226	6.77	16.99
4	*****	127	353	9.55	26.54
5	*****	139	492	10.45	36.99
6	*****	167	659	12.56	49.55
7	*****	192	851	14.44	63.98
8	*****	191	1042	14.36	78.35
9	*****	134	1176	10.08	88.42
10	*****	102	1278	7.67	96.09
11	*****	40	1318	3.01	99.10
12	**	12	1330	0.90	100.00

* * * * * *

30 60 90 120 150 180

FREQUENCY

P R O V I N C I A L R E S U L T S
 DISTRIBUTION OF SCORES - E. ATTITUDE TOWARD SCIENCE
 SCIENCE ASSESSMENT 1986 - GRADE 6

FREQUENCY BAR CHART

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	*	30	30	2.26	2.26
1	*	34	64	2.56	4.81
2	**	84	148	6.32	11.13
3	*****	302	450	22.71	33.83
4		21	471	1.58	35.41
5	*****	859	1330	64.59	100.00

——*—*—
 200 400 600 800
 FREQUENCY

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - F . S C I E N C E A N D S O C I E T Y

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 6

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	*****	107	107	8.05	8.05
1	*****	73	180	5.49	13.53
2	*****	101	281	7.59	21.13
3	*****	144	425	10.83	31.95
4	*****	181	606	13.61	45.56
5	*****	185	791	13.91	59.47
6	*****	214	1005	16.09	75.56
7	*****	164	1169	12.33	87.89
8	*****	109	1278	8.20	96.09
9	*****	42	1320	3.16	99.25
10	*	10	1330	0.75	100.00

* * * * * * *
30 60 90 120 150 180 210

F R E Q U E N C Y

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - G . N A T U R E O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 6

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	*****	85	85	6.39	6.39
1	*****	54	139	4.06	10.45
2	*****	82	221	6.17	16.62
3	*****	163	384	12.26	28.87
4	*****	241	625	18.12	46.99
5	*****	248	873	18.65	65.64
6	*****	224	1097	16.84	82.48
7	*****	139	1236	10.45	92.93
8	*****	94	1330	7.07	100.00

* * * * *

50 100 150 200 250

FREQUENCY

CHAPTER 4
PROVINCIAL RESULTS - GRADE 9
SUBTESTS - GRADE 9

<u>CATEGORIES</u>	<u>ITEM NUMBERS</u>
A. CONTENT OF SCIENCE	
1. Facts -----	1 -14
2. Terminology -----	15-18 and 101-107
3. Concepts/Relationships -----	19 and 108-115
4. Theories and Conceptual Schemes -----	116-119
5. Explanation of Physical Phenomena -----	20 and 120
6. Trends and Sequences -----	121-123
B. PROCESSES OF SCIENCE	
7. Observing and Classifying	
8. Measuring/Quantifying	
9. Identifying, Collecting, and Interpreting Data	
10. Making Inferences/Hypothesizing	
11. Building, Testing, and Revising Theoretical Models	
Note: Most of the questions in categories 7-11 are at the integrated process level. It is not possible to code each question to a particular process.----- 21-27 and 124-141	
C. SKILLS FOR SCIENCE	
12. Skills Using Laboratory Equipment -----	28-30 and 142-152
13. Skills Associated With Safety -----	31-37
D. PROBLEM SOLVING AND DECISION MAKING	
14. Cognition -----	153-156
15. Following Instructions/Using Algorithms--	38-42
16. Using Inquiry Techniques -----	157-160
17. Application of Knowledge -----	161-162
E. ATTITUDE TOWARD SCIENCE	
18. Enjoying Science -----	43-45
19. Valuing Science -----	46-49
20. Adopting Attitudes of Science -----	50-58
21. Making Career Decisions -----	59-74
F. SCIENCE AND SOCIETY	
22. Science in Canada -----	163-172
23. Health, Nutrition and Agriculture -----	75-79
24. Environment -----	80-81
25. Energy -----	173-175
26. Recreation -----	no questions
G. NATURE OF SCIENCE	
27. History of Science -----	82-91
28. Philosophy of Science -----	176

PRELIMINARY REPORT

PROVINCIAL RESULTS

SCIENCE ASSESSMENT 1986 - GRADE 9

PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION

(* INDICATES CORRECT RESPONSE)

QUESTION	A	B	C	D	E	NR
A1. FACTS						
1	30.0	10.8	46.7*	12.1	0.0	0.5
2	2.9	11.3	7.5	3.2	74.4*	0.6
3	14.1*	41.8	32.1	11.4	0.0	0.5
4	10.2	26.0	12.1	50.4*	1.0	0.3
5	32.8	13.4	6.2	9.3	38.1*	0.3
6	27.3	31.2	31.1*	9.6	0.1	0.7
7	7.1	13.5	16.1	62.2*	0.3	0.8
8	5.5	30.6*	49.0	11.8	2.4	0.8
9	41.3*	34.2	16.5	7.0	0.5	0.4
10	12.6	29.1	45.6*	11.9	0.3	0.4
11	24.6	37.3*	18.1	19.5	0.2	0.3
12	39.3	17.4	14.5	21.8*	6.4	0.5
13	34.0	42.8	21.3*	0.9	0.5	0.5
14	25.4	51.8*	5.9	16.3	0.2	0.4
A2. TERMINOLOGY						
15	75.0*	10.9	3.0	10.6	0.0	0.5
16	39.2	9.8	6.9	43.2*	0.3	0.6
17	16.0	14.6	20.1	47.3*	1.0	1.0
18	26.5	10.9	24.8*	36.6	0.6	0.6
A3. CONCEPTS/RELATIONSHIPS						
19	36.0	12.4	47.9*	2.6	0.3	0.8
A5. EXPLAN. OF PHYSICAL...						
20	35.0	6.9	15.3	41.7*	0.3	0.9
B. PROCESSES OF SCIENCE						
21	9.6	71.0*	11.4	6.0	0.2	1.8
22	19.7	14.6	50.2*	12.4	1.1	1.9
23	5.4	11.9	5.9	2.4	73.2*	1.2
24	14.1	16.0	21.1	46.7*	0.9	1.3
25	6.4	38.7*	34.4	7.5	11.3	1.6
26	5.3	3.6	20.1	68.2*	1.3	1.5
27	16.3	18.3	9.4	53.9*	0.2	2.0
C12. SKILLS USING LABORATORY...						
28	10.3	27.9	40.6*	17.4	0.2	3.6
29	13.3*	4.8	26.7	50.6	0.8	3.9
30	48.7*	13.5	6.3	27.0	0.4	4.1
C13. SKILLS ASSOCIATED...						
31	8.3	3.6	18.0	65.1*	0.6	4.5
32	13.5*	11.1	5.1	6.4	59.4	4.5
33	15.3	7.6	14.3	57.2*	0.3	5.2
34	77.4*	8.2	2.2	6.5	0.4	5.2
35	3.0	59.9	1.8	29.7*	0.5	5.1
36	1.0	3.1	5.8	84.6*	0.3	5.2
37	4.7	6.6	3.3	79.1*	0.5	5.8

D15. FOLLOWING INSTRUCTIONS...

38	15.5	17.1	11.4	53.9*	0.4	1.7
39	16.9	32.0*	20.2	28.5	0.3	2.0
40	27.7	6.5	44.5*	7.6	12.2	1.4
41	5.9	10.2*	46.2	13.8	22.1	1.7
42	8.8	13.9	38.2*	12.3	25.0	1.9

E18. ENJOYING SCIENCE

43	9.1	14.4	33.2	32.2	9.6	1.6
44	4.2	9.4	27.6	28.1	28.9	1.8
45	22.7	12.4	33.5	2.8	26.2	2.4

E19. VALUING SCIENCE

46	79.3	6.9	10.5	1.1	0.4	1.8
47	16.2	57.7	24.0	0.5	0.0	1.7
48	51.9	35.9	9.6	0.5	0.3	1.8
49	12.3	59.0	26.2	0.7	0.3	1.6

E20. ADOPTING ATTITUDES...

50	3.6	4.4	51.4	38.4	0.3	1.9
51	37.8	14.6	42.6	2.8	0.2	1.9
52	22.4	47.2	6.9	15.7	6.1	1.9
53	45.0	12.4	40.0	0.6	0.1	1.9
54	66.8	12.7	18.1	0.3	0.2	1.9
55	21.9	52.2	23.5	0.3	0.2	1.9
56	14.0	68.2	15.6	0.3	0.1	1.9
57	23.7	50.0	22.8	1.2	0.3	2.1
58	83.7	4.4	9.0	0.5	0.1	2.3

E21. MAKING CAREER DEC... - ATTITUDE

59	9.5	18.6	67.4	0.3	0.1	4.1
60	51.6	34.3	9.4	0.2	0.3	4.3
61	5.2	16.7	73.7	0.3	0.3	3.9
62	9.2	35.6	50.7	0.1	0.3	4.0
63	45.4	38.3	11.9	0.2	0.1	4.1
64	4.1	6.9	84.4	0.3	0.4	3.8
65	5.6	12.7	77.1	0.3	0.3	4.1
66	13.0	42.2	40.2	0.4	0.3	3.8
67	6.4	15.5	73.8	0.1	0.3	4.0
68	33.0	51.9	11.0	0.3	0.0	3.8
69	60.0	29.4	6.3	0.4	0.0	3.9
70	56.0	28.1	11.9	0.2	0.0	3.9
71	27.9	54.4	13.8	0.3	0.1	3.6
72	55.0	26.8	14.2	0.2	0.1	3.7
73	30.4	44.6	20.8	0.0	0.2	4.0
74	30.1	48.4	17.4	0.2	0.3	3.6

F23. HEALTH, NUTRITION...

75	16.1	30.1	20.2*	11.4	19.6	2.5
76	58.8*	5.2	4.1	5.6	23.8	2.4
77	41.4	8.8	45.1*	2.0	0.4	2.2
78	1.4	23.8*	18.1	12.4	42.1	2.3
79	68.1*	5.3	4.7	6.5	13.1	2.3

F24. ENVIRONMENT

80	15.8	5.2	3.0	54.6*	18.7	2.5
81	10.5	24.0*	43.9	18.8	0.2	2.6

G27. HISTORY OF SCIENCE

82	65.6*	30.5	0.6	0.3	0.0	3.0
83	39.6*	56.6	0.4	0.2	0.0	3.1
84	55.0	41.5*	0.3	0.2	0.1	3.0
85	51.4	45.1*	0.3	0.1	0.2	3.0
86	40.9	55.3*	0.1	0.5	0.2	3.0

87	53.9*	42.6	0.2	0.1	0.1	3.2
88	42.0	54.4*	0.3	0.2	0.0	3.2
89	50.4*	46.2	0.1	0.1	0.1	3.1
90	58.5*	37.6	0.3	0.5	0.0	3.1
91	68.1*	24.0	0.3	0.2	0.0	7.4

ITEMS 92-100 NOT USED IN THIS ASSESSMENT

A2. TERMINOLOGY

101	12.3*	0.0	0.0	0.0	42.6	45.1
102	5.8*	0.0	0.0	0.0	52.7	41.6
103	14.0*	0.0	0.0	0.0	54.7	31.3
104	32.3*	0.0	0.0	0.1	47.8	19.8
105	50.0*	0.0	0.0	0.0	22.4	27.5
106	61.5*	0.0	0.0	0.0	32.4	6.1
107	7.8*	0.0	0.0	0.0	53.3	39.0

A3. CONCEPTS/RELATIONSHIPS

108	57.4*	0.0	0.0	0.0	38.6	4.0
109	59.2*	0.0	0.0	0.0	36.8	4.0
110	82.5*	0.0	0.0	0.0	13.4	4.1
111	46.1*	0.0	0.0	0.0	21.8	32.1
112	47.4*	0.0	0.0	0.0	31.1	21.5
113	28.2*	0.0	0.0	0.0	64.0	7.8
114	19.8*	0.0	0.0	0.0	65.2	15.0
115	86.2*	0.0	0.0	0.0	8.7	5.1

A4. THEORIES & CONCEPT...

116	21.8*	0.0	0.0	0.0	54.7	23.5
117	10.9*	0.0	0.0	0.0	52.5	36.6
118	14.2*	0.0	0.0	0.0	39.0	46.8
119	6.9*	0.1	0.0	0.0	36.7	56.2

A5. EXPLAN. OF PHYSICAL...

120	13.3*	19.3	0.0	0.0	53.9	13.5
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A6. TRENDS AND SEQUENCES

121	11.5	22.9	16.3	29.0	9.6	10.7
122	30.8*	0.0	0.0	0.0	51.4	17.8
123	20.8*	0.0	0.0	0.0	52.9	26.2

B. PROCESSES OF SCIENCE

124	41.2*	0.0	0.0	0.0	41.8	17.0
125	33.4*	0.0	0.0	0.0	42.3	24.2
126	32.3*	0.0	0.0	0.0	36.6	31.1
127	19.5*	0.0	0.0	0.0	45.0	35.5
128	11.4*	0.0	0.0	0.0	44.2	44.4
129	12.2*	0.0	0.0	0.0	40.8	47.0
130	12.6*	0.0	0.0	0.0	40.3	47.1
131	9.9*	0.0	0.0	0.0	40.9	49.2
132	33.9*	0.0	0.0	0.0	38.5	27.6
133	34.0*	0.0	0.0	0.0	34.1	31.8
134	13.5*	0.0	0.0	0.0	69.9	16.6
135	89.7*	0.0	0.3	0.1	2.3	7.7
136	81.7*	0.0	0.0	0.0	10.8	7.5
137	87.5*	0.0	0.0	0.0	5.0	7.5
138	44.6*	0.1	0.0	0.2	47.4	7.7
139	51.5*	0.3	0.1	0.1	40.2	7.9
140	39.5	3.2	26.3	11.6	4.2	15.2
141	7.9*	22.5	0.1	0.0	45.8	23.7

C12. SKILLS USING LABORATORY...							
142	73.9*	0.0	0.0	0.0	16.9	9.1	
143	56.7*	0.0	0.1	0.0	33.7	9.5	
144	48.4*	0.0	0.1	0.0	40.7	10.8	
145	73.3*	0.0	0.1	0.0	17.0	9.6	
146	7.3*	0.0	0.0	0.0	40.0	52.8	
147	70.9*	0.0	0.0	0.0	15.7	13.4	
148	35.4*	0.0	0.0	0.0	37.9	26.7	
149	30.2*	0.0	0.0	0.0	37.6	32.2	
150	14.0*	0.0	0.0	0.0	55.8	30.2	
151	45.3*	0.0	0.0	0.0	18.8	35.9	
152	17.0*	0.0	0.0	0.0	34.1	48.9	
D14. COGNITION							
153	70.1*	0.0	0.0	0.0	22.4	7.5	
154	72.1*	0.0	0.0	0.0	20.4	7.5	
155	36.0*	0.0	0.0	0.0	46.6	17.4	
156	61.6*	0.0	0.0	0.0	26.7	11.7	
D16. USING INQUIRY TECHNIQUES							
157	55.7*	0.0	0.0	0.0	29.8	14.5	
158	30.6*	0.0	0.0	0.0	53.7	15.7	
159	74.5*	0.0	0.0	0.0	12.3	13.2	
160	31.2*	0.0	0.0	0.0	52.7	16.1	
D17. APPLICATION OF KNOW...							
161	42.5*	0.0	0.0	0.0	31.2	26.3	
162	34.3*	0.0	0.0	0.0	34.4	31.3	
F22. SCIENCE IN CANADA							
163	47.2	0.0	0.0	0.0	0.1	52.7	
164	37.9	0.0	0.0	0.0	0.1	62.0	
165	25.0	0.0	0.0	0.0	0.1	74.9	
166	83.1	0.0	0.0	0.0	0.1	16.9	
167	65.5	0.0	0.0	0.1	0.1	34.4	
168	58.7	0.0	0.0	0.0	0.1	41.2	
169	85.5	0.0	0.0	0.0	0.2	14.3	
170	59.8	0.0	0.0	0.0	0.2	40.1	
171	76.7	0.0	0.0	0.0	0.2	23.1	
172	35.1	0.0	0.0	0.0	0.6	64.4	
F25. ENERGY							
173	46.4*	0.0	0.0	0.0	41.3	12.3	
174	9.1*	6.9	0.0	0.0	61.7	22.3	
175	35.4*	0.0	0.2	0.1	41.7	22.7	
G28. PHILOSOPHY OF SCIENCE							
176	26.4	2.5	10.3	1.1	39.5	20.2	

P R O V I N C I A L R E S U L T S

SCIENCE ASSESSMENT 1986 - GRADE 9 RESULTS

NUMBER OF STUDENT SCORES USED TO COMPUTE STATISTICS 1181

PERFORMANCE ON COGNITIVE SUBTESTS

SUBTEST	QUESTIONS PER SUBTEST	MEAN RAW SCORE	MEAN PERCENT	STANDARD DEV RAW SCORE
TOTAL TEST (COGNITIVE)	122	51.82	42.47	15.50
A1. FACTS	14	5.67	40.47	2.20
A2. TERMINOLOGY	11	3.74	34.00	1.75
A3. CONCEPTS...	9	4.75	52.74	2.04
A4. THEORIES...	4	0.54	13.48	0.84
A5. EXPLANATION...	2	0.55	27.48	0.62
A6. TRENDS...	2	0.52	25.83	0.74
A. CONTENT (TOTAL)	42	15.76	37.52	5.63
B. PROCESSES (TOTAL)	24	10.19	42.45	4.20
C12. SKILLS USING LAB..	14	5.75	41.08	2.73
C13. SKILLS ASSOC...	7	4.07	58.09	1.56
C. SKILLS (TOTAL)	21	9.82	46.75	3.60
D14. COGNITION	4	2.40	59.95	1.23
D15. FOLLOWING INST...	5	1.79	35.77	1.11
D16. USING INQUIRY...	4	1.92	48.01	1.18
D17. APPLICATION...	2	0.77	38.40	0.80
D. PROBLEM SOLVE (TOTAL)	15	6.87	45.83	3.06
F23. HEALTH, NUTRITION..	5	2.16	43.22	1.28
F24. ENVIRONMENT	2	0.79	39.29	0.67
F25. ENERGY	3	0.91	30.31	0.84
F. SCIENCE-SOCIETY (TOT)	10	3.86	38.56	2.04
G27. HISTORY OF SCIENCE	10	5.32	53.23	1.80
G. NATURE (TOTAL)	10	5.32	53.23	1.80

P R O V I N C I A L R E S U L T S

D I S T R I B U T I O N O F S C O R E S - A . C O N T E N T O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 9

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	*	3	3	0.25	0.25
1		1	4	0.08	0.34
2		2	6	0.17	0.51
3		2	8	0.17	0.68
4	*	4	12	0.34	1.02
5	**	12	24	1.02	2.03
6	***	13	37	1.10	3.13
7	*****	27	64	2.29	5.42
8	*****	34	98	2.88	8.30
9	*****	54	152	4.57	12.87
10	*****	67	219	5.67	18.54
11	*****	72	291	6.10	24.64
12	*****	59	350	5.00	29.64
13	*****	79	429	6.69	36.33
14	*****	86	515	7.28	43.61
15	*****	94	609	7.96	51.57
16	*****	82	691	6.94	58.51
17	*****	74	765	6.27	64.78
18	*****	52	817	4.40	69.18
19	*****	64	881	5.42	74.60
20	*****	50	931	4.23	78.83
21	*****	52	983	4.40	83.23
22	*****	53	1036	4.49	87.72
23	*****	36	1072	3.05	90.77
24	*****	25	1097	2.12	92.89
25	*****	26	1123	2.20	95.09
26	****	18	1141	1.52	96.61
27	**	11	1152	0.93	97.54
28	**	11	1163	0.93	98.48
29	*	5	1168	0.42	98.90
30	*	4	1172	0.34	99.24
31	*	5	1177	0.42	99.66
32		2	1179	0.17	99.83
35		1	1180	0.08	99.92
38		1	1181	0.08	100.00

20 40 60 80

F R E Q U E N C Y

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - B . P R O C E S S E S O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 9

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	***	15	15	1.27	1.27
1	**	9	24	0.76	2.03
2	***	16	40	1.35	3.39
3	*****	25	65	2.12	5.50
4	*****	31	96	2.62	8.13
5	*****	50	146	4.23	12.36
6	*****	61	207	5.17	17.53
7	*****	107	314	9.06	26.59
8	*****	100	414	8.47	35.06
9	*****	125	539	10.58	45.64
10	*****	109	648	9.23	54.87
11	*****	95	743	8.04	62.91
12	*****	95	838	8.04	70.96
13	*****	88	926	7.45	78.41
14	*****	66	992	5.59	84.00
15	*****	71	1063	6.01	90.01
16	*****	34	1097	2.88	92.89
17	*****	30	1127	2.54	95.43
18	****	20	1147	1.69	97.12
19	***	17	1164	1.44	98.56
20	**	10	1174	0.85	99.41
21		1	1175	0.08	99.49
22		2	1177	0.17	99.66
23	*	4	1181	0.34	100.00

* * * * * * *
20 40 60 80 100 120

F R E Q U E N C Y

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - C . S K I L L S F O R S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 9

F R E Q U E N C Y B A R C H A R T

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	*****	27	27	2.29	2.29
1	**	10	37	0.85	3.13
2	***	15	52	1.27	4.40
3	**	12	64	1.02	5.42
4	*****	39	103	3.30	8.72
5	*****	34	137	2.88	11.60
6	*****	51	188	4.32	15.92
7	*****	87	275	7.37	23.29
8	*****	101	376	8.55	31.84
9	*****	118	494	9.99	41.83
10	*****	148	642	12.53	54.36
11	*****	132	774	11.18	65.54
12	*****	143	917	12.11	77.65
13	*****	94	1011	7.96	85.61
14	*****	78	1089	6.60	92.21
15	*****	50	1139	4.23	96.44
16	*****	27	1166	2.29	98.73
17	**	8	1174	0.68	99.41
18	*	6	1180	0.51	99.92
19		1	1181	0.08	100.00

20 40 60 80 100 120 140

FREQUENCY

P R O V I N C I A L R E S U L T S

DISTRIBUTION OF SCORES - D. PROBLEM SOLVING & DECISION MAKING

SCIENCE ASSESSMENT 1986 - GRADE 9

FREQUENCY BAR CHART

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	***	23	23	1.95	1.95
1	****	32	55	2.71	4.66
2	*****	60	115	5.08	9.74
3	*****	74	189	6.27	16.00
4	*****	84	273	7.11	23.12
5	*****	108	381	9.14	32.26
6	*****	119	500	10.08	42.34
7	*****	151	651	12.79	55.12
8	*****	155	806	13.12	68.25
9	*****	126	932	10.67	78.92
10	*****	102	1034	8.64	87.55
11	*****	90	1124	7.62	95.17
12	*****	35	1159	2.96	98.14
13	**	15	1174	1.27	99.41
14	*	6	1180	0.51	99.92
15		1	1181	0.08	100.00

30 60 90 120 150

FREQUENCY

P R O V I N C I A L R E S U L T S
 DISTRIBUTION OF SCORES - F. SCIENCE AND SOCIETY
 SCIENCE ASSESSMENT 1986 - GRADE 9

FREQUENCY BAR CHART

RAW SCORE		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	*****	54	54	4.57	4.57
1	*****	93	147	7.87	12.45
2	*****	176	323	14.90	27.35
3	*****	206	529	17.44	44.79
4	*****	212	741	17.95	62.74
5	*****	192	933	16.26	79.00
6	*****	118	1051	9.99	88.99
7	*****	79	1130	6.69	95.68
8	*****	39	1169	3.30	98.98
9	*	10	1179	0.85	99.83
10		2	1181	0.17	100.00

* * * * * *
30 60 90 120 150 180 210

FREQUENCY

P R O V I N C I A L R E S U L T S
D I S T R I B U T I O N O F S C O R E S - G . N A T U R E O F S C I E N C E

S C I E N C E A S S E S S M E N T 1 9 8 6 - G R A D E 9

F R E Q U E N C Y B A R C H A R T

